

**WHAT IS CLAIMED IS:**

- 1     1.     A variable voltage protection device comprising:  
2             a ground plane;  
3             a layer of neat dielectric polymer or glass in contact with one  
4     surface of the ground plane; and  
5             at least one electrical conductor of an electronic device in  
6     contact with said neat dielectric polymer or glass layer;  
7     wherein the neat dielectric polymer or glass layer positioned between  
8     and in contact with the ground plane and said electrical conductor  
9     consists essentially of a layer of neat dielectric polymer or glass having  
10    a thickness of less than about 1.6 mils.
- 1     2.     A device according to Claim 1 wherein the polymer layer is less  
2     than about 0.8 mil.
- 1     3.     A device according to Claim 1 wherein the polymer layer is less  
2     than about 0.5 mil.
- 1     4.     A device according to Claim 1 wherein the polymer layer is less  
2     than about 0.2 mil.
- 1     5.     A variable voltage protection component for placement between  
2     a ground plane and an electronic circuit comprising:  
3             a layer of variable voltage material comprising a binder  
4     containing conductive particles or semiconductive particles; and  
5             a layer of neat dielectric polymer or glass in contact with one  
6     surface of said layer of variable voltage material;

7 wherein the neat dielectric polymer or glass layer is present in a  
8 thickness of less than about 1.6 mils.

1 6. A component according to Claim 5 wherein the neat dielectric  
2 polymer or glass layer is less than about 0.8 mil.

1 7. A component according to Claim 5 wherein the neat dielectric  
2 polymer or glass layer is less than about 0.5 mil.

1 8. A component according to Claim 5 wherein the neat dielectric  
2 polymer or glass layer is less than about 0.2 mil.

1 9. A component according to Claim 5 comprising a layer of neat  
2 dielectric polymer or glass in contact with the second surface of the  
3 layer of variable voltage material.

1 10. A component according to Claim 6 comprising a layer of neat  
2 dielectric polymer or glass in contact with the second surface of the  
3 layer of variable voltage material.

1 11. A variable voltage protection component for placement between  
2 a ground plane and an electronic circuit comprising:  
3 a first layer of variable voltage protection material comprising a  
4 binder having dispersed therein at least about 20% by volume of  
5 conductive or semiconductive particles;  
6 a second layer of variable voltage protection material in contact  
7 with the first layer comprising a binder having dispersed therein at least  
8 40% by volume of conductive or semiconductive particles; and

9           a third layer of variable voltage protection material in contact  
10 with said second layer comprising a binder having dispersed therein at  
11 least 20% by volume of conductive or semiconductive particles.

1    12.   A component according to Claim 11 wherein at least one of the  
2    layers of variable voltage protection material comprises conductive  
3    particles and semiconductive particles.

1    13.   A component according to Claim 11 wherein the volume percent  
2    in the three layers comprise at least about 30%, at least about 40%  
3    and at least about 30% respectively.

1    14.   A component according to Claim 12 wherein the volume percent  
2    in the three layers comprise at least about 30%, at least about 40%  
3    and at least about 30%, respectively.

1    15.   The component according to Claim 11 wherein the volume  
2    percent in the three layers comprise at least about 30%, at least about  
3    60% and at least about 30%, respectively.

1    16.   A component according to Claim 12 wherein the volume percent  
2    in the three layers comprise at least about 30%, at least about 60%  
3    and at least about 30%, respectively.

1    17.   A component according to Claim 11 comprising a layer of neat  
2    dielectric polymer or glass in contact with one surface of said  
3    component wherein the neat dielectric polymer or glass layer is present  
4    in a thickness of less than about 1.6 mils.

1 18. A component according to Claim 12 comprising a layer of neat  
2 dielectric polymer or glass in contact with one surface of said  
3 component wherein the neat dielectric polymer or glass layer is present  
4 in a thickness of less than about 1.6 mils.

1 19. A component according to Claim 17 comprising a layer of neat  
2 dielectric polymer or glass in contact with the second surface of said  
3 component.

1 20. A component according to Claim 18 comprising a layer of neat  
2 dielectric polymer or glass in contact with the second surface of said  
3 component.

29  
1 21. A variable voltage protection component for placement between  
2 a ground plane and an electronic circuit comprising:  
3 a first layer of variable voltage protection material which is in  
4 direct contact with an electrical conductor in said electronic circuit and  
5 comprises a binder having dispersed therein at least about 20% by  
6 volume of conductive or semiconductive particles; and  
7 a second layer of variable voltage protection material in contact  
8 with the first layer comprising a binder having dispersed therein at least  
9 40% by volume of conductive or semiconductive particles.

30 29  
1 22. A variable voltage protection component according to Claim 21  
2 further comprising a third layer of variable voltage protection material  
3 in contact with said second layer comprising a binder having dispersed  
4 therein conductive or semiconductive particles at a % by volume which  
5 is different than the second layer. 20  
A

insert  
✓

31  
1 23. A variable voltage protection component for placement  
2 between a ground plane and an electronic circuit comprising:  
3 a layer of neat dielectric polymer or glass which is in direct  
4 contact with an electrical conductor in said electronic circuit;  
5 a first layer of variable voltage protection material in contact  
6 with said layer of neat dielectric polymer or glass and comprises a  
7 binder having dispersed therein at least about 20% by volume of  
8 conductive or semiconductive particles; and  
9 a second layer of variable voltage protection material in contact  
10 with the first layer of variable voltage protection material comprising a  
11 binder having dispersed therein conductive or semiconductive particles  
12 at a <sup>40</sup>% by volume which is different than in said first layer.

32  
1 24. A variable voltage protection component according to Claim 23  
2 further comprising a third layer of variable voltage protection material  
3 in contact with said second layer comprising a binder having dispersed  
4 therein conductive or semiconductive particles at a <sup>20</sup>% by volume which  
5 is different than the second layer.

1 25. A method of making a variable voltage protection material  
2 comprising:  
3 forming a mixture comprising conductive particles and insulating  
4 particles in a light organic solvent;  
5 mixing said mixture to disperse the insulating particles in the  
6 conductive particles;  
7 evaporating at least a portion of the solvent; and  
8 mixing the resultant mixture of conductive particles and  
9 insulating particles with a binder to form a variable voltage protection  
10 material.

1    26.    A method according to Claim 25 comprising:  
2            sieving the mixture of particles and solvent before evaporating  
3    the solvent.

1    27.    A method according to Claim 25 comprising:  
2            adding semiconductive particles to form a mixture comprising  
3    conductive particles, semiconductive particles and light organic  
4    solvent.

1    28.    A method according to Claim 25 comprising:  
2            forming a separate mixture comprising semiconductive particles  
3    and insulative particles in a light organic solvent;  
4            mixing said mixture to disperse the insulating particles in the  
5    semiconductive particles;  
6            evaporating at least a portion of the solvent; and  
7            mixing the resultant mixture of conductive particles and  
8    insulating particles and the resultant mixture of semiconductive  
9    particles with a binder to form a variable voltage protection material.